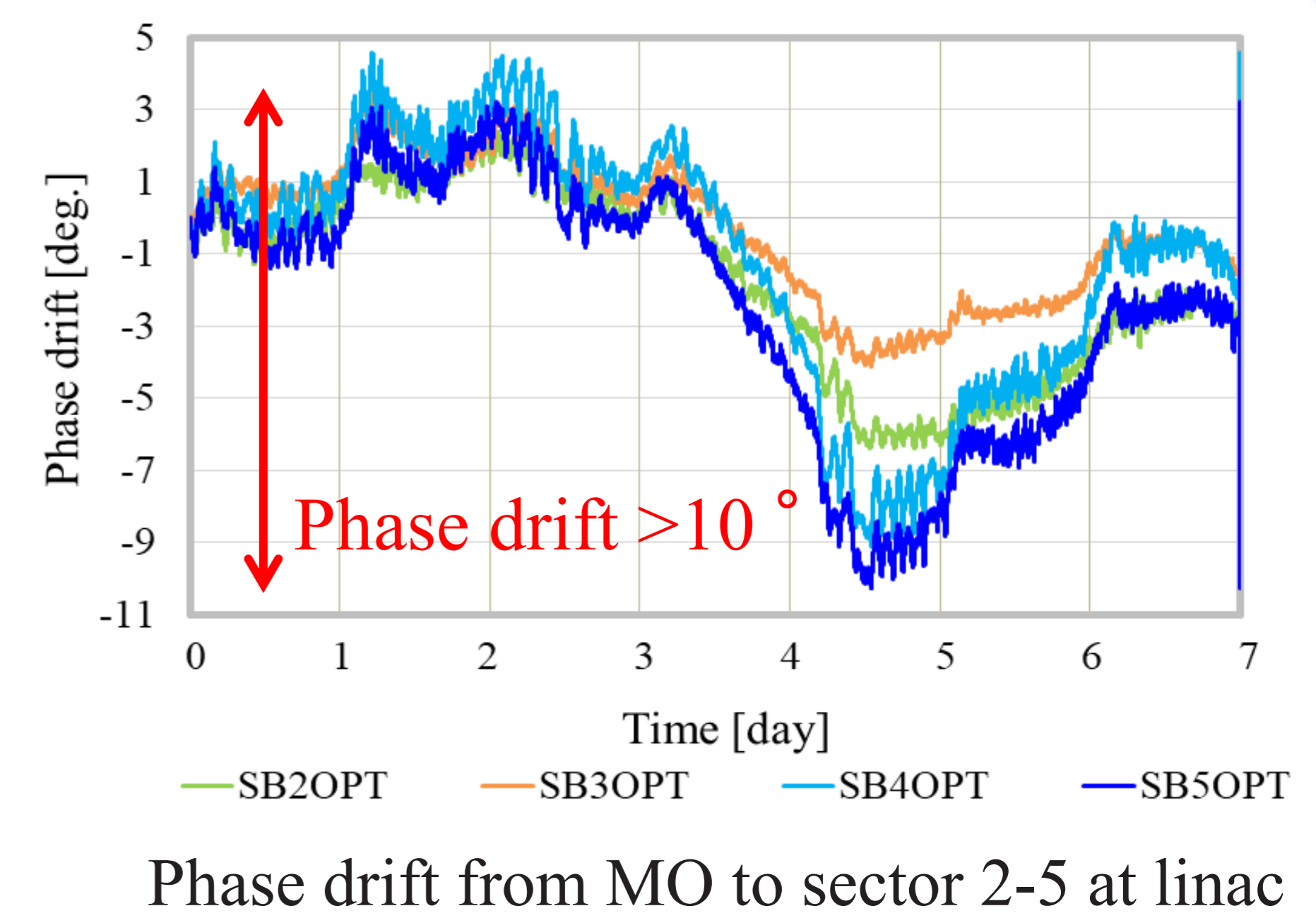
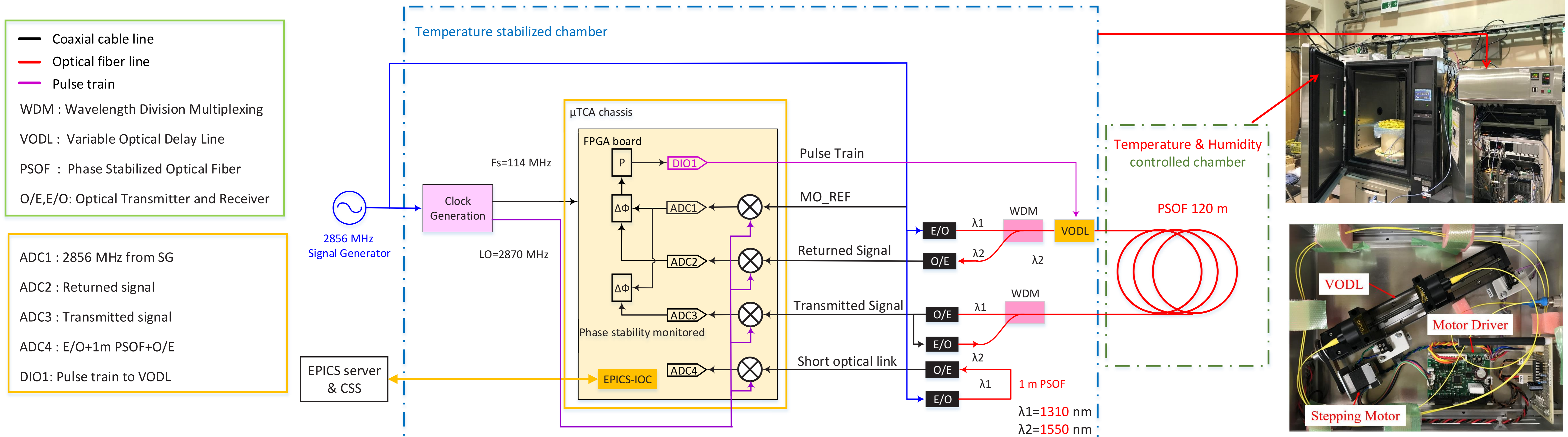


Introduction

- ❖ KEK e-/e+ injector LINAC :124.8 m long and 488.3 m long straight beam lines, 8 sectors (sector A-C,1-5)
- ❖ The Master Oscillator (MO, 571 MHz) system generates 2856 MHz reference signal
- ❖ 2856 MHz RF reference signal is delivered to sector 2 to 5 by optical links
- ❖ Gallery environment: humidity 10-50 %RH (not controlled), temperature stabilized ± 1 °C
- ❖ The long-term phase drift of the reference phase from MO to sector 2-5 was observed more than 10 degree for 7 days by the phase monitor at linac gallery (large humidity effect: 25%RH fluctuation)
- ❖ The phase stabilization system is important for stable RF operation.

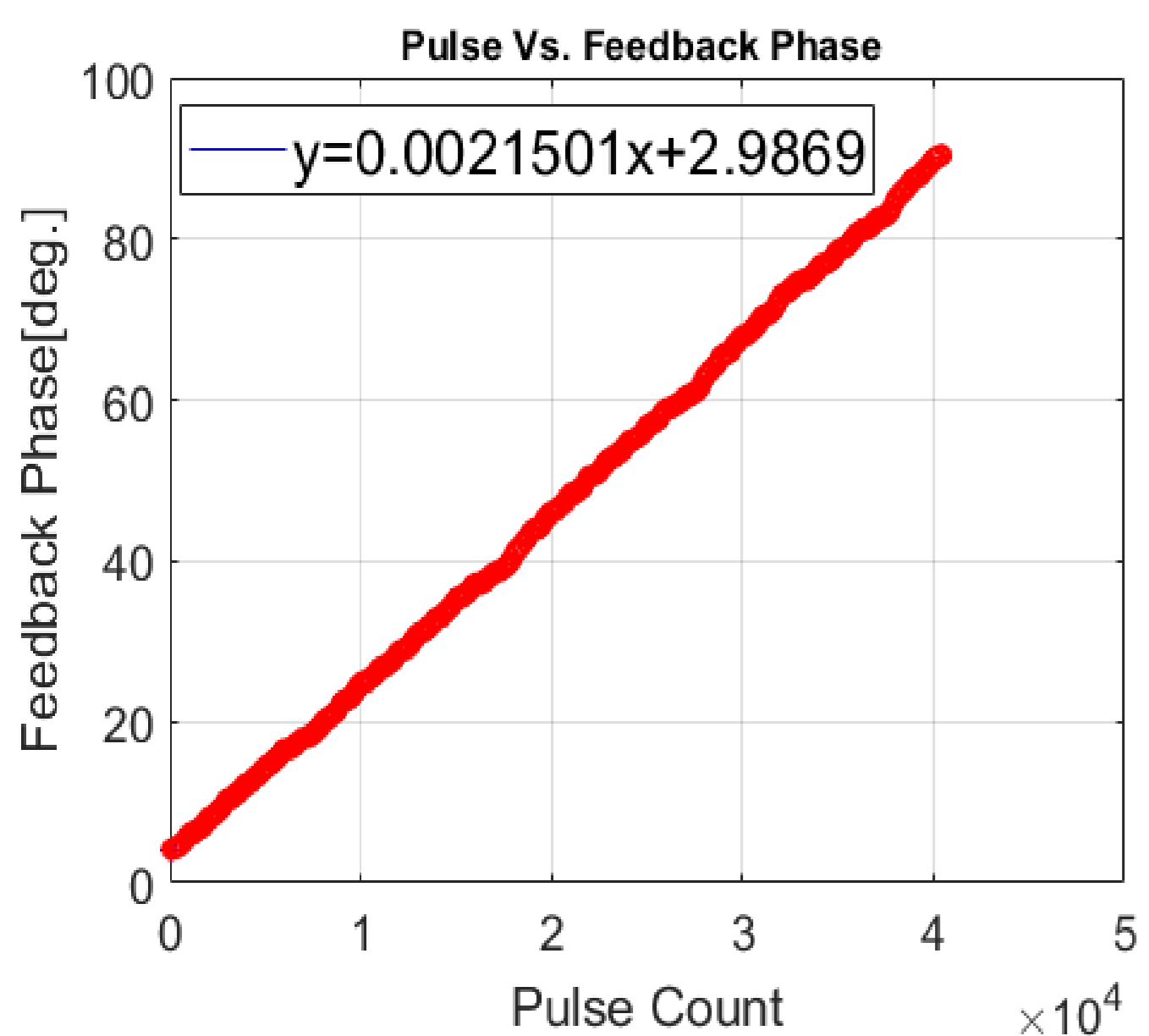


Overview of the phase stabilization system for performance evaluation



VODL Measurement

- Resolution :2.15 mdeg/pulse
- Phase range: more than 90°



Temperature and humidity characteristics

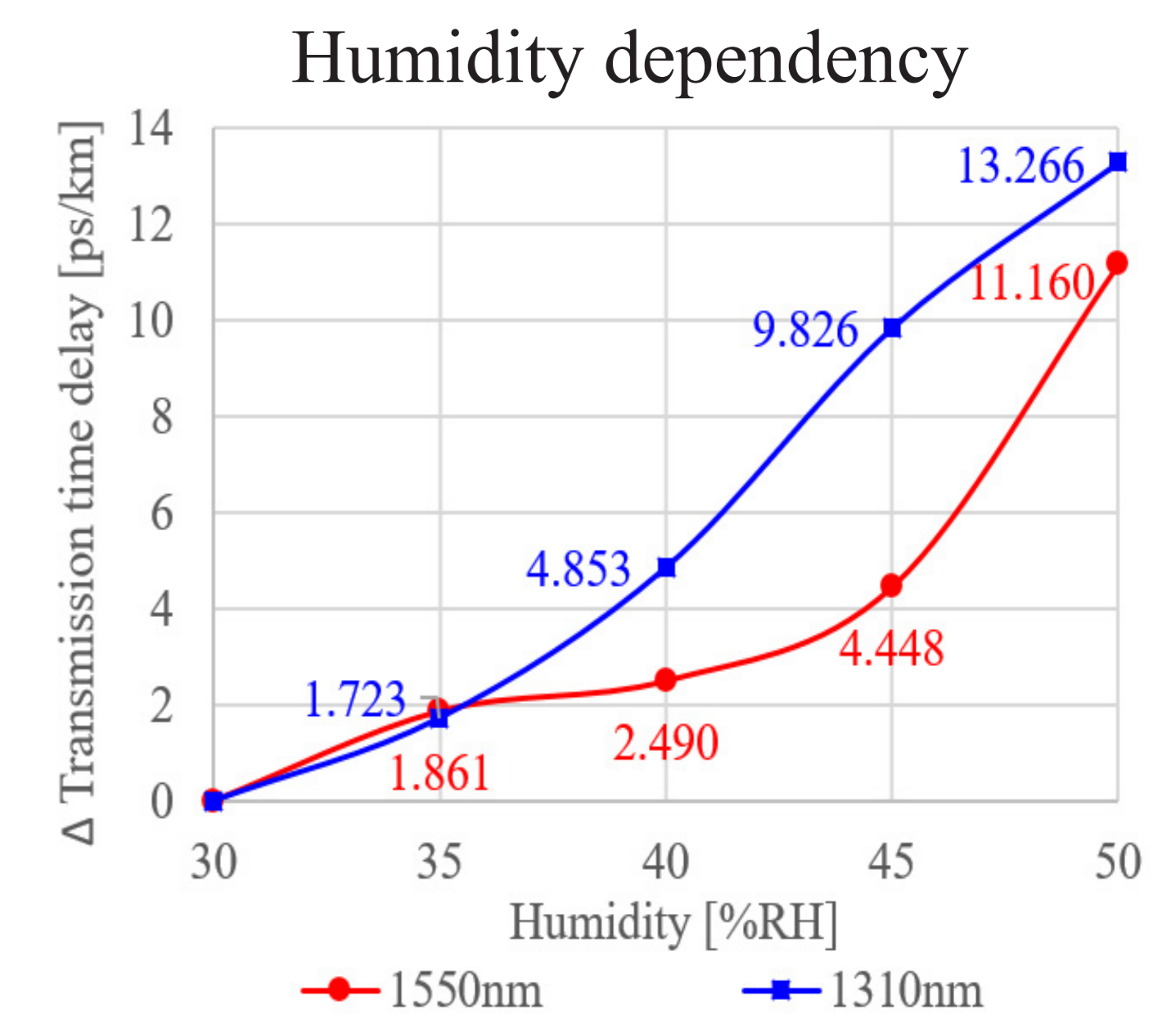
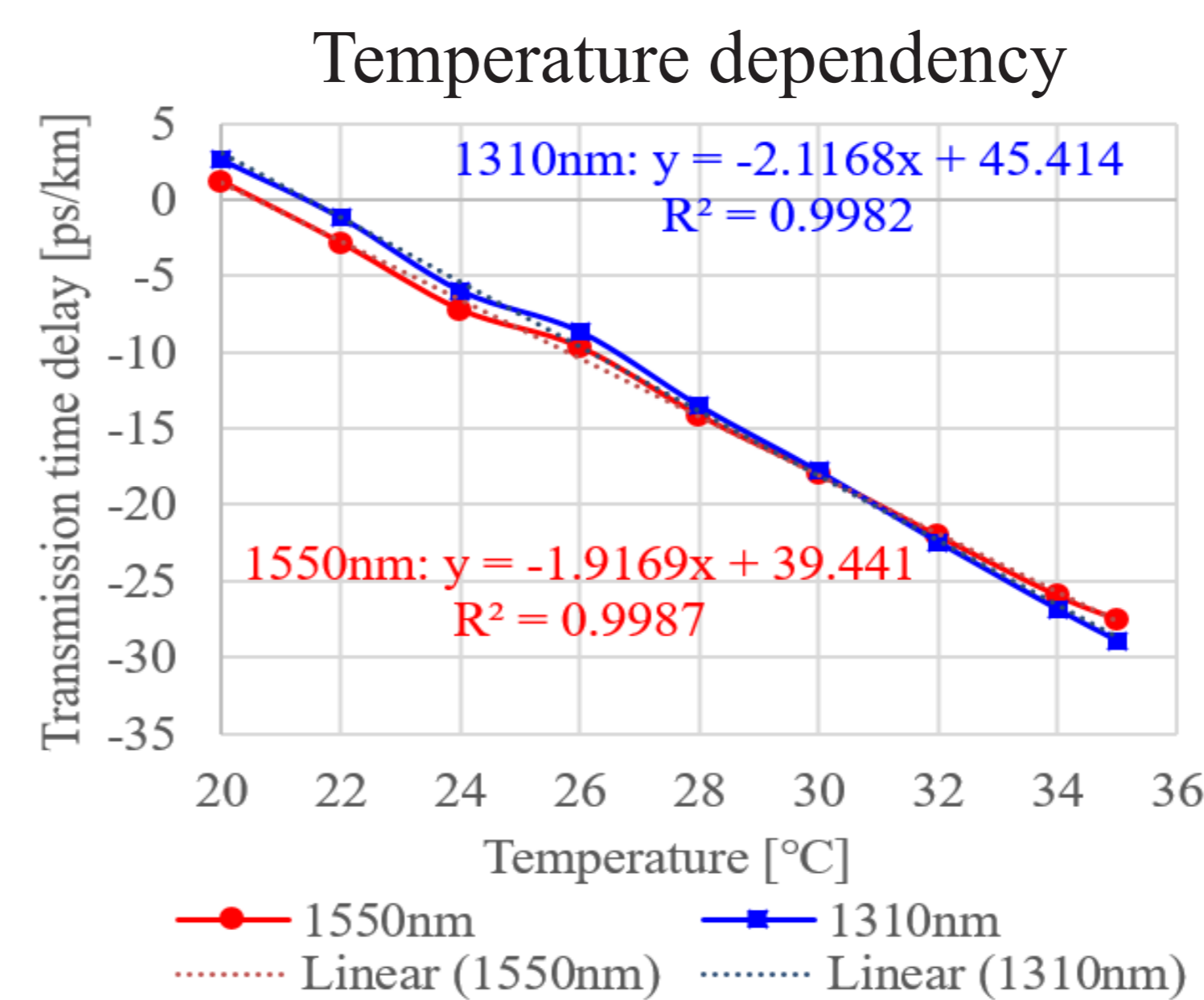
TAMAGAWA E/O and O/E

Items	EOC-144/OEC-1041
RF Input range	10 ~ 3000 MHz
Temperature range	+10 ~ +40 °C
Temperature coefficient	-0.6154 ps/°C
Humidity coefficient	-0.0382 ps/%RH

- Propagation delay temperature coefficient difference is 0.2 ps/km/°C.
- The time delay difference depends on the different relative humidity values.
- The maximum difference is 5.38 ps/km at approximately 45% RH.

PSOF with different wavelength 1310nm and 1550nm

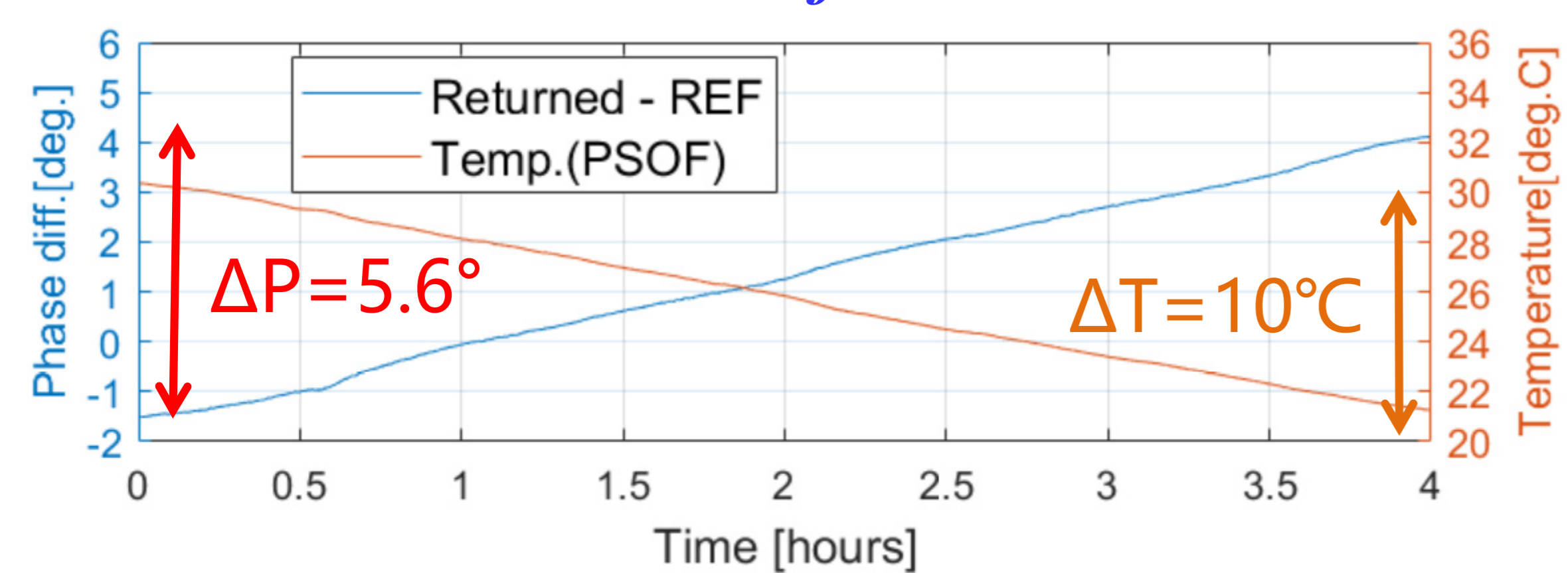
- Free extension of the 120 m long PSOF (unbound)



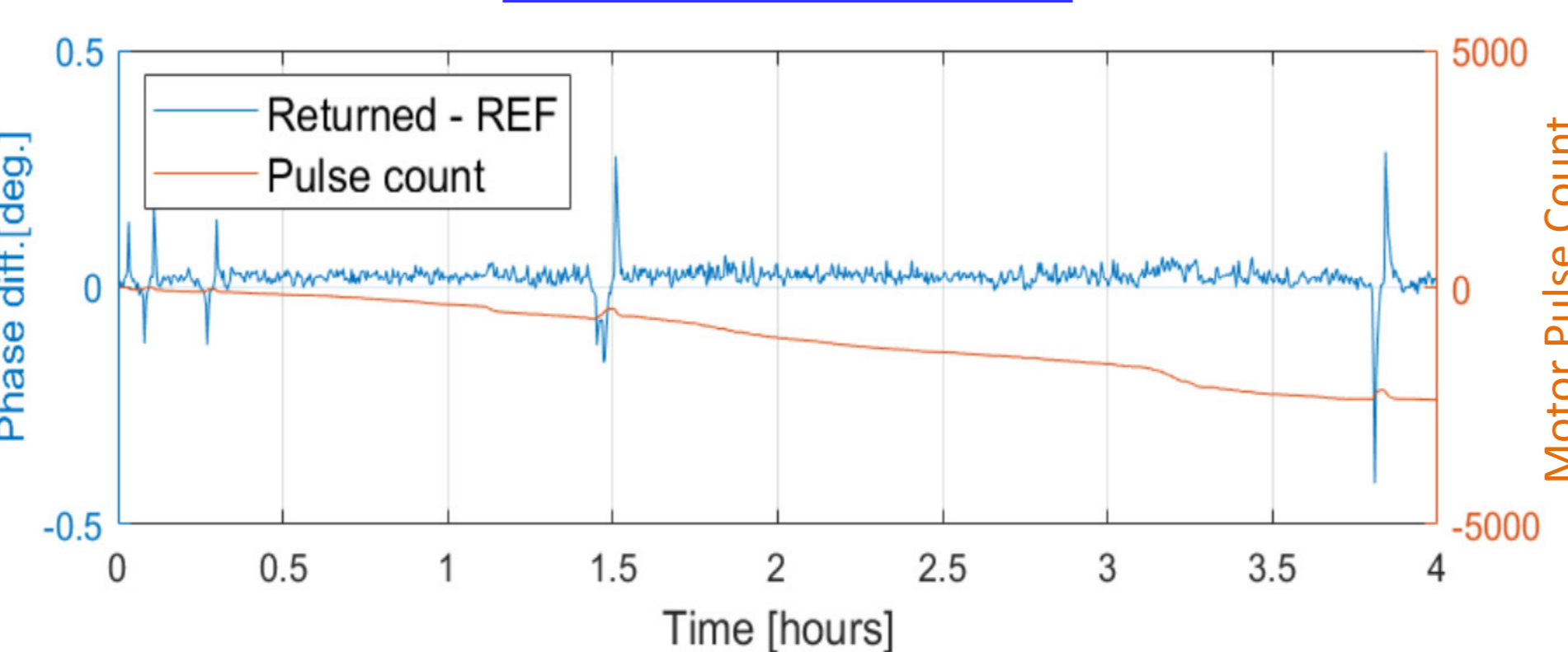
Feedback performance evaluation

- All the feedback system: temperature stabilized in the chamber (TC)
- 120 m PSOF: as simulated transmission line inside temperature and humidity controlled chamber (THC)
- Temperature inside THC : 30 °C to 20 °C, 2.5 °C/hour, @stable humidity 40%RH

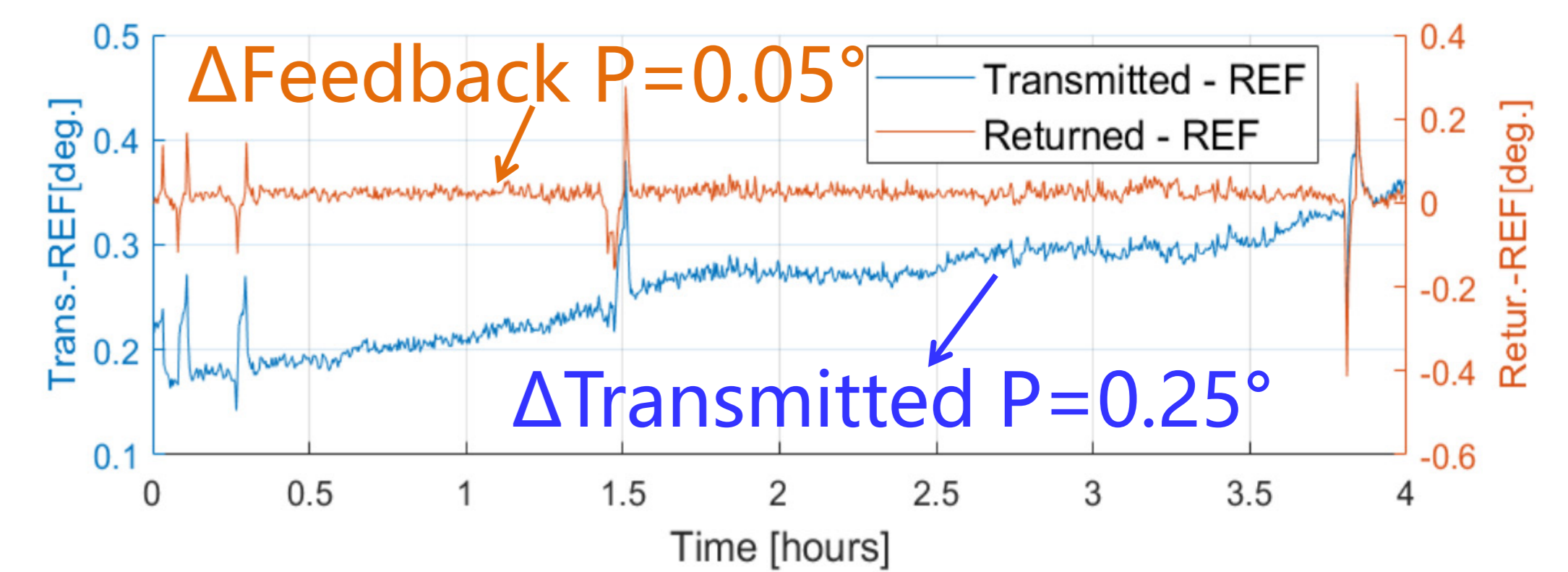
Without feedback



With feedback



Wavelength difference effect



Feedback phase:
 5.6 deg. to 0.05 deg.
 (1/100 compressed!)

